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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,032	06/04/2002	Steinar Bjærø	15-DS-00560	9756

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EXAMINER

LAVIN, CHRISTOPHER L

ART UNIT

PAPER NUMBER

2624

DATE MAILED: 07/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/064,032	Applicant(s) BJAERUM ET AL.	
	Examiner Christopher L. Lavin	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2006.  
 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-22 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☒ The drawing(s) filed on 04 June 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

This action is in response to the amendment filed on 05/02/06.

#### ***Claim Rejections - 35 USC § 103***

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
3. Claims 1 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki (5,622,174) in view of Washburn (6,017,309).

In regards to claim 1, Yamazaki discloses In an ultrasound machine for generating an image responsive to moving structure within a region of interest of a subject by displaying at least one color characteristic corresponding to a movement parameter of said structure, apparatus for mapping said color characteristic comprising: a front-end arranged to transmit ultrasound waves into said structure and to generate received signals in response to ultrasound waves backscattered from said structure in said region of interest over a time period (Figure 54, items 11 and 15); a processor

responsive to (i) said received signals to generate a set of parameter signals representing values of said movement parameter within said structure during said time period, (ii) a distribution of said set of parameter signals, and (iii) a mapping algorithm to generate a set of color characteristic signals representative of said values of said movement parameter (Figure 54, item 43; col. 26, line 51 – col. 27, line 44: Cardiac Velocity of a placed ROI is measured and a velocity color map is created to color the image.), [wherein said mapping algorithm comprises a mapping function formed by generating a cumulative total of frequency of occurrence of said values of said movement parameter, and normalizing the cumulative total to a color map]; and a display arranged to display a color representation of said moving structure in response to said set of color characteristic signals (Figure 60).

The newly added claim language marked off with [...] requires an adaptive color-mapping step, which Yamazaki does not teach. However adaptive color mapping schemes in the ultrasound art are well known as shown by Washburn (col. 8, line 31 – col. 9, line 19). Washburn teaches creating an ultrasound velocity color map of blood flow using a histogram.

Therefore it would have been obvious to one skilled in the art at the time of the invention to use an adaptive color-mapping step as taught by Washburn in the apparatus disclosed by Yamazaki. Yamazaki teaches of using a lookup table to assign colors, as Washburn teaches (col. 7, lines 6 – 43) such a technique can lead to saturation, as well as prevent a full range of colors to be used. By Stretching out the

histogram so as many colors as possible can be used the user will be able to better identify the structure, leading to better diagnoses.

In regards to claim 2, The apparatus of claim 1 wherein said moving structure comprises cardiac tissue (Figure 60).

In regards to claim 3, The apparatus of claim 1 further comprising a user interface arranged to enable an operator to select said region of interest from said image on a monitor (Figure 54, item 43; col. 26, line 51 – col. 27, line 44: The user places the ROI using the operation panel.).

In regards to claim 4, The apparatus of claim 1, wherein said movement parameter comprises one of velocity and strain rate (col. 26, lines 58 – 65).

In regards to claim 5, The apparatus of claim 1, wherein said color characteristic comprises hue (col. 26, lines 58 – 65: Hue is the gradation of color, as there are multiple colors used to display the velocity color map, this map's color characteristic comprises hue.)

In regards to claim 6, The apparatus of claim 1, wherein said time period comprises at least a portion of a cardiac cycle (col. 27, line 30).

In regards to claim 7, The apparatus of claim 1 wherein said distribution of said set of parameter signals comprises a histogram representing frequency of occurrence of said values of said movement parameter (col. 27, lines 37 – 44).

In regards to claim 8, The apparatus of claim 7 wherein said mapping algorithm generates a mapping function comprising a cumulative total of the occurrence of said values of said histogram (Washburn: col. 8, line 31 – col. 9, line 19).

In regards to claim 9, The apparatus of claim 8 wherein said mapping algorithm further comprises normalization of said cumulative total to a domain of a color characteristic legend (Washburn: col. 9, lines 3 – 19: Histogram equalization is normalization of the histogram.).

In regards to claim 10, The apparatus of claim 8 wherein at least one of said histogram and said mapping function is weighted (col. 8, lines 42 – 54: By maximizing low velocity flow Washburn is weighting the histogram and the mapping function.).

In regards to claims 11 – 17, claims 11 – 17 are rejected for the same reasons as claims 1 – 7. The argument analogous to that presented above for claims 1 – 7 is applicable to claims 11 – 17.

In regards to claims 18 – 20, claims 18 – 20 are rejected for the same reasons as claims 8 – 10. The argument analogous to that presented above for claims 8 – 10 is applicable to claims 18 – 20.

4. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Yamazaki and Washburn as applied to claims 1 and 11 above, and further in view of Pesque (5,718,229).

The combination of Yamazaki and Washburn disclose a system where a color map is stretched over the full dynamic range of a display. The well known meaning for dynamic range in the art is the range of brightness levels a display is capable of outputting. This is what Washburn is maximizing. By maximizing the dynamic range Washburn is allowing the maximum number of colors to be displayed. The Washburn reference is all about utilizing the most number of colors possible, but Washburn never

Art Unit: 2624

specifies that the entire color spectrum (Red to Violet) is used in the color map. However it is well known in the art to utilize the entire spectrum in the art of ultrasound color mapping of movement as shown by Pesque (col. 4, lines 1 – 40).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use the full color spectrum (as taught by Pesque) in the adaptive color-mapping scheme taught by the combination of Yamazaki and Washburn. By using the entire color spectrum in the color mapping the most number of varied colors will be applied allowing for the image with the most color variation and thus the most detail. The more detail a user can see the better the diagnosis will be.

### ***Response to Arguments***

5. Applicant's arguments filed 05/02/06 have been fully considered but they are not persuasive.

6. Applicant's arguments with respect to claims 1-6 and 11 – 16 are moot as the amendment required new grounds of rejection.

7. In regards to applicants arguments with respect to Washburn. The applicant's primary argument seems to be that "the background section of the present application discusses the drawbacks of Washburn". While this may be the case, that doesn't void the art. Washburn teaches all of the required steps, using a normalized histogram for adaptive color mapping. Again the examiner suggests that it is not the concept of adaptive color mapping (or which colors are used) that the applicant should focus on, but rather the algorithm used to create the adaptive color map.

***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
9. US Pat. 6,176,82 discloses another adaptive color mapping algorithm.
10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher L. Lavin whose telephone number is 571-272-7392. The examiner can normally be reached on M - F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on (571) 272-7453. The fax phone

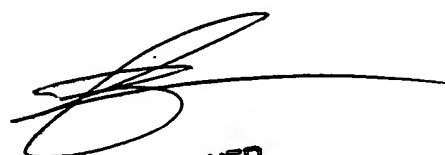


Art Unit: 2624

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Christopher Lavin



**BRIAN WERNER**  
**PRIMARY EXAMINER**